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THESIS

**SURVIVAL ANALYSIS OF THE MODERNIZED
RETIREMENT SYSTEM FOR THE UNITED STATES
MARINE CORPS**

by

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March 2016

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**SURVIVAL ANALYSIS OF THE MODERNIZED RETIREMENT SYSTEM FOR
THE UNITED STATES MARINE CORPS**

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requirements for the degree of

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ABSTRACT

This thesis analyzes the Modernized Retirement System introduced in the National Defense Authorization Act for fiscal year 2016. Specifically, this thesis determines if the Modernized Retirement System is likely to affect manpower levels.

A survey was conducted within the active component of the U.S. Marine Corps to compare expected lengths of service between the current retirement system and the Modernized Retirement System. The analysis utilizes Kaplan-Meier survival analysis for expected lengths of service and probit regression models to evaluate various retirement choices under the Modernized Retirement System.

The results of the analysis indicate the U.S. Marine Corps will experience a change in expected lengths of service for officers and enlisted Marines under the Modernized Retirement System. On average, enlisted Marines exhibit an approximate 2 percentage-point difference in length of service while officers exhibit an approximate 15 percentage-point difference across the two retirement systems. As the U.S. Marine Corps implements the Modernized Retirement System in 2018, retention and recruiting policies will need to adjust to retain and recruit the necessary individuals to serve in the U.S. Marine Corps.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Australian Defence Force
DOD	Department of Defense
DOD ID	Department of Defense Identification Number
MEF	Marine Expeditionary Force
MOS	military occupational specialty
MRS	Modernized Retirement System
NDAA	National Defense Authorization Act
TFDW	Total Force Data Warehouse
TSP	Thrift Savings Plan
USMC	United States Marine Corps

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I. INTRODUCTION

With an increasingly fiscally austere environment, the Department of Defense (DOD) needs to make prudent cost-saving decisions. Manpower, the largest appropriation of the DOD budget, totals approximately \$178.9 billion for fiscal year 2016 (Office of the Under Secretary of Defense (Comptroller), 2015a). Of the \$178.9 billion manpower appropriation, retired pay accrual accounts for approximately 10% (Office of the Under Secretary of Defense (Comptroller), 2015b). Efforts to reduce spending on military personnel are not new to the 2016 budget. The National Defense Authorization Act (NDAA) for fiscal year 2013 established the Military Compensation and Retirement Modernization Commission (hereafter referred to as “the Commission”). The Commission spent 2013 and 2014 researching a variety of cost-savings initiatives for Congress, one particularly being retirement reform. In January of 2015, the Commission submitted their recommendation to Congress on reforming the retirement system, which was subsequently approved on the NDAA for fiscal year 2016 for implementation in 2018. However, those within the DOD and other military advocates fear the new retirement system will affect future manning and recruiting efforts.

The primary objective of this research is to determine if the Modernized Retirement System has a likelihood of affecting retention levels. Surveying the active component of the U.S. Marine Corps provided information related to expected length of service under the current and new retirement systems. In addition to expected length of service, the survey provided insight on the impacts of the shift in retirement system, specifically opt-in rates for eligible Marines, contribution rates to the Thrift Savings Plan, and lump sum participation rates under the new retirement system. The research used data from the survey and demographic data from the Total Force Data Warehouse (TFDW). In examining economic theory, workers make job choices based on a number of factors, one being compensation. This research contributes to literature on worker choice and the importance of competitive compensation packages. Based on the economic theory of worker choice, I believe the U.S. Marine Corps will not experience any significant shift in retention rates.

As preparations began for the 2016 budget, Secretary of Defense Ashton Carter spoke to Congress discussing compensation. In his remarks, Secretary Carter (2015a) discussed the need to not only provide service members with adequate pay and other compensation, but also to shift some funding from compensation to training, readiness, and capabilities. Investing in those areas is the responsible decision to prevent needlessly putting service members in unnecessary risk situations on the battlefield. Secretary Carter's thoughts are echoed in a recent study by Gustman, Steinmeier, and Tabatabai (2015). They found younger veterans are exhibiting lower retirement wealth compared to older cohorts. Modernizing the retirement system may assist in retirement wealth for future veterans.

Currently, the retirement system uses a practice known as "cliff vesting," in which service members are required to serve a minimum of 20 years before they are eligible for voluntary retirement. No government-sponsored benefits exist for service members who leave the military prior to serving the required 20 years for retirement eligibility. According to the Commission (2015), the current generation of service members prefers more "flexible retirement options, rather than the defined benefit" system in place. Due to the shift in retirement benefit desires coupled with the need to remain competitive with the civilian market, Congress modernized the retirement system. Under the Modernized Retirement System, the retirement plan is comprised of two components—a defined benefit portion and a defined contribution portion. Further, Congress incorporated other aspects for force retention and retirement payout flexibility for service members.

While researching new retirement systems, the Commission looked to the private sector for ideas and best practices. The private sector first pioneered the shift to hybrid retirement plans in the early 1990s. Those shifts are documented in scholarly literature studying the private sector and military contexts. Choi (2015) analyzed the defined contribution pension plans, specifically discussing the effects of employee participation, contribution rates, and automatic enrollment in the defined contribution plan. Choi (2015) used economic theory to explain that employer match rates should not affect the employee's decision "to participate in a defined contribution plan." In justifying his statement, Choi evaluates previous studies and identifies significant errors indicating that

it is difficult to empirically measure the relationship between employer match rates and employee participate rates. In discussing employee contribution rates, Choi used the income and substitution effects to illustrate the difficulty in predicting matches with average employee contribution rates. Last, Choi discussed companies automatically enrolling employees at a default contribution rate to the defined contribution plan. Based on his research, Choi states that “automatically enrolled employees usually do not stop contributing to the plan once enrolled,” resulting in increased financial stability for employees (Choi, 2015, p. 12).

In examining defined contribution plans, the question of a default rate and investment fund becomes more important to understand. Choi, Laibson, Madrain, and Metrick (2001) analyzed three different companies and their default 401(k) contribution rates. In their research, they found that companies who use default enrollment in a company’s defined contribution pension plan drastically increase participation rates. The researchers found that 65–87% of plan participants remained at the default contribution rate and the default fund initially; however, participation rates at the default rate and fund decreased over time. The researchers conclude automatic enrollment in defined contribution plans increases participation rates and increases wealth accumulation; however, the low default rate and low-risk default fund do not significantly increase retirement savings.

In order to make an informed choice when considering contribution rates, investment funds, and other financial decisions, financial literacy is crucial to sound financial decisions. Hastings, Madrian, and Skimmyhorn (2013) discussed the importance of financial literacy, and its relationship with solid financial decisions. They cited a myriad of examples found in literature indicating low financial literacy may correlate with individuals foregoing participation in 401(k) or other retirement savings plans, lack of portfolio diversification, and purchase of whole life insurance policies rather than cheaper term plans (Hastings, Madrian, & Skimmyhorn, 2013). In their review, they identified conflicting arguments for the “effects of financial literacy and financial outcomes” (Hastings, Madrian, & Skimmyhorn, 2013). Because of the number of

contributing factors to increasing financial literacy varying across individuals, research in this area is inconclusive according to the authors.

The Australian Defence Force shifted their retirement compensation package in the early 1990s. Cunha, Menichini, and Crockett (2015) analyzed the Australian Defence Force's retirement plan shift. Similar to the United States' Department of Defense retirement plan, the Australian Defence Force (ADF) had a 20-years-of-service defined benefit retirement plan until 1991. Individuals serving in the ADF for 20 years or more were eligible for "a pension equal to a percentage of their final pay" (Cunha, Menichini, & Crockett, 2015). In 1991, the ADF shifted to a retirement plan which had both a defined benefit and defined contribution aspect similar to what Congress recently approved for the DOD. Using survival analysis, Cunha, Menichini, and Crockett show that the high years of service vesting requirement had significant retention impacts on the ADF.

Even though updating the retirement system was necessary, doing so judiciously remains a priority. Managing force levels with constantly changing civilian market opportunities demands that the compensation package for military service members remain competitive in order to retain service members for a career. Asch, Hosek, and Mattock (2014) studied recommended retirement plans similar to the recently approved plan; however, they applied historical data to the retirement plans to estimate retention. Surveying the U.S. Marine Corps and explicitly asking the expected length of service will provide more useful results.

The results of this thesis reveal an interesting finding on expected length of service. According to my research, the Modernized Retirement System induces young enlisted Marine to remain in the U.S. Marine Corps longer. Conversely, officers exit the U.S. Marine Corps at a higher rate under the Modernized Retirement System compared to the current retirement system. My findings may have implications for recruitment and retention policies. Marines are more likely to contribute to the Thrift Savings Plan at 5% or higher. I believe Marines want to maximize their retirement wealth by ensuring they receive the maximum government matching. Another important financial finding is the decision to opt into the new retirement system. Younger Marines, both officer and

enlisted, have a higher probability to opt into the Modernized Retirement System compared to older Marines.

This thesis focuses on the DOD shift in retirement plans and the manpower implications of the new retirement system. Chapter II discusses the genesis of the military retirement system, and its evolution over time. In Chapter II, I introduce the Modernized Retirement System and a detailed description of changes to the DOD retirement plan is provided. Chapter III describes the methodology in the research to include the data sources and analysis methods. Chapter IV provides the research data and results of the analysis. Conclusions based on the research findings and further research recommendations are found in Chapter V.

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II. BACKGROUND

To thoroughly understand the significance of the recent change to the military retirement system, it is important to understand the origins of the current system. Throughout its history, there have been three major milestones in the retirement system. In 1948, the retirement system was first standardized across all military services (DOD Office of the Actuary, 2015). The 1948 system remained unchanged until 1980 when a new retirement annuity formula was introduced, known as High Three (DOD Office of the Actuary, 2015). The last major revision to the military retirement system was in 1986 when another annuity formula known as REDUX was introduced to provide service members some financial flexibility (Kamarck, 2015). The retirement system remained unchanged from 1986 until 2015 with the approval of the National Defense Authorization Act for fiscal year 2016. The NDAA radically changed the military's approach to retirement with the introduction of the modernized retirement system.

The following historical summation of the military retirement system relies heavily on information from the Office of the Actuary and a Congressional Research Service report. Since World War II, the U.S. military retirement system remained relatively stable with cliff vesting at 20 years of service. The Army and Air Force Vitalization and Retirement Equalization Act of 1948 standardized the non-disability retirement plan for the Army, Air Force, and Navy. The act established 20 years of service as a minimum for voluntary retirement (DOD Office of the Actuary, 2015, p. 54). Military service members who entered the military before September 8, 1980 receive a defined benefit equal to their final monthly basic pay multiplied by 2.5% for each year of service (Kamarck, 2015). This retirement compensation package is known as the Final Basic Pay System. In December of 1980, the retired pay formula was changed to what is now known as the High Three formula. Under the High Three option, service members who entered the military after September 8, 1980 receive a defined benefit equal to the average of the final three years of basic pay multiplied by 2.5% for every year of service (Kamarck, 2015).

The Military Retirement Reform Act of 1986 changed the military's retirement system again, adding a third retirement compensation system known as the REDUX system. Under the REDUX system, military service members receive 2% of their basic pay for each year under 20 years of service, 3.5% for the next 10 years, and then 2.5% for any remaining time of creditable service after 30 years. At the age of 62, the service member's pension was recomputed to match the High Three annuity. However, Kamarck (2015) noted the REDUX formula was changed in 1999. Under the updated REDUX option, "service members who entered the military on or after August 1, 1986 receive a \$30,000 career status bonus at 15 years of service" (contingent on 5 more years of military service), and the retirement multiplier is reduced to 2.0% from 2.5%. The defined benefit calculation remains the same as the "High Three" option using the new multiplier (Kamarck, 2015). Service members currently serving in the military who do not qualify for the Final Basic Pay System are required to choose their retirement package at 15 years of qualified service; they must select either the High Three or REDUX package.

Since 1999, the military retirement system has remained unchanged. However, with the large portion of the budget devoted to manpower coupled with criticisms of the military retirement system, Congress sought to reduce retirement expenditures by modernizing the retirement system. According to Asch, Hosek, and Mattock (2014), the military retirement system was antiquated and did not match the evolving civilian retirement systems. They noted a number of deficiencies with the military's retirement system, stating that a "minority of military members qualifies for retirement benefits—roughly 34% of officers and 14% of the enlisted force" (p. v). In the private sector, vesting occurs much sooner and incorporates a defined contribution plan to the defined benefit plan known as a hybrid retirement system. Although individuals vest much earlier in the private sector compared to the DOD, retirement benefits do not begin until the individual reaches full retirement age as defined by the Social Security Administration. Conversely, service members receive a retirement annuity immediately upon retiring. The defined contribution plan provides employees the ability to take some retirement benefits whether they leave a company at 10 years or retire from the company. Asch, Hosek, and

Mattock (2014) stated that service members, generally, prefer current over deferred compensation. Due to the increasing personnel costs and outdated retirement system, Congress looked to modernize the military's retirement system.

With the approval of the NDAA for fiscal year 2016, the military retirement system changed significantly to better match the private sector and provide some level of benefits to all service members. The new retirement plan, known as the Modernized Retirement System (MRS) takes effect in the 2018 calendar year. The MRS has four components. Under the MRS, service members are eligible to receive a defined benefit after serving 20 years of credible service. The defined benefit is calculated in the same way as the REDUX program, meaning the final three years of basic pay is averaged and multiplied by 2.0% for every year of credible service. The NDAA established a defined contribution under the MRS. Service members will automatically be enrolled in the defined contribution plan at 3% of their basic pay (Carter, 2015b). The government will deposit an amount equal to 1% of the service member's basic pay until the service member has served two years of service. When a service member reaches two years of service, the government will match the individual contribution up to 4%. Service members can adjust their contribution amount after they complete their first financial education course at their first duty station. Service members can choose how to invest their contributions in the Thrift Savings Plan (TSP) account.

At the discretion of the service secretaries, a continuity bonus may be paid to service members during 8 to 12 years of service. The DOD will provide a continuation bonus contingent on serving four more years of service. The bonus amounts to 2.5 times a service member's monthly basic pay. Last, the MRS contains a lump sum option. Service members have the option of receiving a portion of their pension as a lump sum. In particular, a service member can choose to receive at retirement a lump sum payment of either 25% or 50% of the pension payments they would have received through 67 years of age. If a lump sum option is chosen, monthly pension amounts will be reduced by 25% or 50% until age 67. At 67 years of age, all service members will receive 100% of their entitled monthly pay regardless of whether they opted to receive the lump sum payment.

With the creation of the Modernized Retirement System, the military retirement system is set to significantly change in 2018, arguably the most significant change in the history of the system. DOD leadership and external agencies fear the change will affect manpower levels across the entire DOD. Separately, whether or not this new system will generate savings for the DOD remains a concern for budgeting purposes. The addition of a defined contribution plan as well as the option to shift to the new system for currently serving service members leaves a large knowledge gap for future budgeting.

III. DATA AND METHODOLOGY

With a conceptual framework of the retirement system in place, this chapter describes my methodology in research. I first discuss the economy theory of worker choice and utility functions. Using economic theory, I discuss how choice and utility functions influenced my survey. While creating the survey, I made some assumptions which ultimately shaped the construction of the survey and survey population. After discussing the assumptions in the construction of the survey and the survey population, I provide a general overview of the survey format. The complete survey can be found in the appendix. In addition to the survey, I used multiple data sources for a more robust analysis of the economic choices of the survey participants. Last, I provide a description of my methods of analysis.

Economic theory suggests workers make decisions on jobs based on utility functions for each individual. Workers weigh hours of work and leisure as well as compensation when making job preference decisions. Compensation is not limited to merely the hourly wage or salary but rather all benefits, tangible and intangible. The retirement system of a firm plays a critical role in workers' job preference decisions. Workers not only consider compensation within the firm but also compare outside options with other firms.

When discussing compensation and retirement specifically, service members regularly make the decision to either remain in the military or leave in pursuit of other private sector opportunities. Costo (2006) discusses the decline in defined benefit retirement systems, listing a myriad of reasons. The most significant reason for the decline is the increasing deferred costs on a firm. With the introduction of 401(k) and 403(b) defined contribution plans, firms shifted their retirement systems from the defined benefit plans to more defined contribution plans due in large part of the tax benefits to both the worker and firm. Costo (2006) notes the decline of defined benefit plans and rise of defined contribution plans. This shift allows vesting much earlier for the worker. The defined contribution plan allows workers to become more mobile in job movement which is attractive to the millennial generation (Asch, Hosek, & Mattock, 2014, p. vi).

The new Modernized Retirement System remains highly competitive, offering defined benefits immediately upon retirement unlike private sector retirement systems requiring workers to reach retirement age before pension annuities begin. That aspect alone supports my hypothesis that the U.S. Marine Corps will not see a significant effect on manpower with the implementation of the Modernized Retirement System. The added defined contribution plan provides some retirement wealth for all service members regardless of length of service.

In order to conduct my research, I created a survey to elicit retirement choices of Marines. While creating the survey, I made assumptions and created informational tools for survey participants. With an eye for cost estimates for the U.S. Marine Corps, I designed two metrics to categorize survey participants' risk tolerance and default behaviors. In the survey, I had a series of questions to help categorize those behaviors. First, I created some risk tolerance questions adapted from a survey created by Grable and Lytton (1999). Although their original survey contained 20 questions, I used the first five questions in my survey. I felt the five questions I chose provided an accurate representation of risk tolerance. I scored the five risk questions of the survey using the same grading criteria created by Grable and Lytton. In order to then categorize Marines on a scale from low to high risk individuals, I used the same score distribution as the 20 question survey and applied it to my five questions. Table 1 provides the aggregate risk score and categorization of risk tolerance.

Table 1. Categorization of Risk Tolerance

Aggregate Risk Score	Description
0–5	Low Risk
6–9	Below Average
10–12	Average
13–16	Above Average
17–20	High Risk

I used a similar approach in calculating the default index for the survey participants. I wrote two questions with the purpose of identifying participants' propensity to adjust default configurations such as default settings on a new computer. With the Modernized Retirement System establishing a default individual contribution rate for each service member, I felt an index measuring propensity for accepting defaults may provide useful information for financial forecasting under the Modernized Retirement System.

In constructing the survey, I felt survey participants needed monetary amounts to assist them in making decisions. Because the defined benefit remained a constant feature in both the current and Modernized Retirement System, I estimated pre-tax retirement annuity amounts for both officers and enlisted personnel. Table 2 is an example of an annuity table I provided survey participants.

Table 2. Example of Retirement Annuity Table

RANK AT 20 YEARS OF SERVICE	MONTHLY PENSION	
	HIGH-3	REDUX
E-6	\$1,900	\$1,500
E-7	\$2,200	\$1,800
E-8	\$2,400	\$1,900
E-9	\$2,800	\$2,200
O-4	\$3,700	\$3,000
O-5	\$4,200	\$3,300

Because the Modernized Retirement System introduces a defined contribution aspect, I provided survey participants with estimated Thrift Savings Plan balances across various participation rates and rates of return. I first chose the default participation rate established by the DOD as 3% of a Marine's basic pay. I then chose different participation rates based on Choi, Laibson, Madrain, and Metrick's research. To create the various tables, I used the 2015 military pay chart for pre-tax monthly basic pay amounts. Using the standard promotion rates published by Headquarters, United States Marine Corps, I calculated the monthly contributions based on the participation rates, adjusted for inflation (R. Garza, personal communication, October 18, 2015;

Headquarters, United States Marine Corps, 2006). I compounded the balances using the mean rate of return published by the Thrift Savings Plan website (“Annual returns,” n.d.). Of the various Thrift Savings Plan options, I chose the F, C, and S Funds to represent the low, medium and high risk investments, respectively. The table headers provide survey participants with the standard deviation of each investment (“TSP Funds,” n.d.). The tables capture both the individual contribution and the government contribution to include matching starting at 2 years of creditable service. Table 3 is an example of a TSP table I provided survey participants.

Table 3. Example of TSP Table

On average, this investment has a **5%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **1%** and **9%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$4,500	\$11,500	\$18,500	\$23,000
Then you will have, on average, this amount of money at 8 YOS:	\$10,100	\$28,100	\$46,100	\$56,100
Then you will have, on average, this amount of money at 12 YOS:	\$16,100	\$46,100	\$76,200	\$92,300
Then you will have, on average, this amount of money at 16 YOS:	\$22,500	\$65,500	\$108,500	\$131,000
Then you will have, on average, this amount of money at 20 YOS:	\$29,200	\$85,500	\$141,800	\$171,000

The NDAA provided all services the ability to offer continuity bonuses at the discretion of each service secretary. Because the bonus is a possibility and an important length of service consideration, providing monetary figures on possible bonus amounts remained consistent with my logic in constructing the survey to best support educated decisions. Table 4 is the continuity bonus table found in the survey.

Table 4. Continuity Bonus Table

RANK AT 12 YEARS OF SERVICE	CONTINUATION PAY
E-6	\$8,900
E-7	\$9,900
O-4	\$17,500

The Modernized Retirement System also introduced a lump sum option for retiring service members. As I did previously, I provided survey participants with estimated lump sum payout options. The lump sum option provides Marines with a discounted lump sum payment at the moment of retirement with a reduced annuity until full retirement age. For the purposes of my survey, I defined full retirement age as 67 years old (Federal Old-Age and Survivors Insurance Trust Fund, 2015). For enlisted Marines, retirement age from the U.S. Marine Corps was standardized as 38 years old; retirement age was standardized as 44 years old for officers. Using ranks E6 through E9 and O4 through O5, I estimated the total retirement amount for a retiring Marine. I then applied both lump sum options separately and discounted the total using a 7% discount rate (Office of Management and Budget, 1992). The discounted value was the estimated lump sum payout. Next to the lump sum payout, I provide the survey participants with the reduced annuity amount. Table 5 is the lump sum table I used in the survey.

Table 5. Lump Sum Table

	25% LUMP SUM AMT	MONTHLY PENSION	50% LUMP SUM AMT	MONTHLY PENSION
E-6	\$72,300	\$1,100	\$144,500	\$800
E-7	\$86,700	\$1,400	\$173,400	\$900
E-8	\$91,500	\$1,400	\$183,100	\$1,000
E-9	\$106,000	\$1,700	\$212,000	\$1,100
O-4	\$128,500	\$2,300	\$257,100	\$1,500
O-5	\$141,400	\$2,500	\$282,800	\$1,700

While constructing the survey, I realized I had to exclude some individuals from the survey population. I removed prior-enlisted officers and warrant officers from the sample population due to the variability of their time in service. As previously mentioned, the survey provided Marines estimates of retirement annuities, TSP amounts, and lump sum payments based on rank and time in service. When creating those amounts, I used standard promotion rates published by Headquarters, U.S. Marine Corps (R. Garza, personal communication, October 18, 2015; Headquarters, United States Marine Corps, 2006). Because prior enlisted officers and warrant officers have varying commissioning dates and time in service, they do not follow the standard promotion rates

relevant to the survey. Therefore, I removed those individuals from the sample population. I used the TFDW data to remove all prior-enlisted officers and warrant officers from my survey population.

According to the NDAA, service members with 12 years of creditable service or less as of December 31, 2017 are eligible to opt into the Modernized Retirement System. Using December 31, 2017, I calculated the years of creditable service of each survey participant with their active duty base date. Using the TFDW data, I removed all Marines with more than 15 years of creditable service from the survey population. The survey was released to Marines serving in the active component, ranks E1 through O4, with 15 years of creditable service or less assigned to I Marine Expeditionary Force (MEF) as of February 6, 2016. Because the survey population joined the military after September 8, 1980, all survey participants are ineligible for the Final Basic Pay System. Due to their ineligibility, all survey participants face the choice between the High Three and REDUX compensation package under the current system.

For my research, I utilized Lime Survey, a web-based survey application hosted by the Naval Postgraduate School. In the survey, I provided Marines with an explanation of the current retirement system and Modernized Retirement System. After the description of each retirement system, I asked survey participants a variety of questions targeting their retirement choices under each system. Specifically, I asked Marines for their expected length of service, Thrift Savings Plan participation, and whether or not they intend to opt into the Modernized Retirement System.

The survey consists of 25 questions divided into four sections: background, current retirement plan, new retirement plan, and miscellaneous. Section I contains nine questions. I asked Marines to provide their Department of Defense Identification (DOD ID) number and identify if they are enlisted or an officer. The DOD ID number was used to match participant responses with demographic data received from TFDW. The data received from TFDW is discussed later in this Chapter. I tailored the survey to provide only relevant dollar amounts based on whether the participant was an enlisted Marine or an officer. I then asked two general questions to identify whether or not participants adjusted default settings. As previously mentioned, these two questions may help identify

propensity to change the default contribution rate for the defined contribution portion of the new retirement system. The remaining five questions were adapted from a survey created by Grable and Lytton (1999) used to identify risk behavior in investments.

Section II contains two questions. After explaining the current retirement system in the U.S. Marine Corps, I asked survey participants to identify which compensation package they would choose if given the option, High Three or REDUX. Additionally, I asked survey participants to provide their expected length of service under the current retirement plan, ranging from 1 year to 20+ years. For the purpose of my research, any service past 20 years was lumped together due to the cliff vesting nature of the DOD retirement system.

Section III contains seven questions. I start Section III with a brief description of the new retirement plan. After the brief description, I asked survey participants if they want more information. Selecting “yes” provided the survey participant with a more detailed explanation of the Modernized Retirement System to include dollar figures with the remaining six questions listed below the explanation. Selecting “no” populated the remaining six questions on the screen. Similar to Section II, I asked participants to provide their expected length of service under the new retirement plan ranging from 1 year to 20+ years. In this section, I asked if the participants understand the differences in the two retirement plans and if they felt the information provided in the survey allowed them to make an informed decision. The remaining three questions asked participants to choose specific aspects of the new retirement plan.

The final section, Section IV, contains seven questions. In this section, I asked survey participants about their current Thrift Savings Plan behaviors. I asked for additional demographic information from survey participants that I was unable to obtain from TFDW. Specifically, I asked if a married Marine’s spouse is employed and household annual earnings. I asked survey participants to imagine they were not in the U.S. Marine Corps and provide the civilian job sector they most likely would be employed, and an estimation of annual salary for themselves and their spouse if not in the military. These three questions may provide an insight on Marines’ opportunity cost to serve in the U.S. Marine Corps.

After the survey was written, I needed to decide how to conduct the survey within the U.S. Marine Corps. Using my experience and knowledge of the organizational structure of the U.S. Marine Corps, I chose to use I MEF as my survey population. A MEF is a three-star major command within the U.S. Marine Corps. The MEF is comprised of all four components of the Marine Air-Ground Task Force and is the most representative unit of the entire U.S. Marine Corps. Encompassing all four components of the Marine Air-Ground Task Force ensured my survey population would be representative of the entire U.S. Marine Corps. Table 6 provides the population of the U.S. Marine Corps and the survey population across all ranks using the survey population constraints.

Table 6. Population Distribution

Rank	Percent in Marine Corps	Percent in I MEF
E-1	3.51	0.28
E-2	12.15	6.62
E-3	27.21	32.54
E-4	24.84	32.61
E-5	16.96	16.44
E-6	7.61	5.23
E-7	0.73	0.4
E-8	0.01	0
E-9	0	0
O-1	0.99	0.48
O-2	1.87	2.23
O-3	3.43	2.77
O-4	0.7	0.39

I requested data from TFDW to assist my analysis. The TFDW data included pay grade, armed forces active duty base date, date of birth, home of record information, race, education, gender, marital status, primary military occupational specialty, Armed Forces Qualification Test, and General Classification Test of all Marines serving in I MEF. At the completion of the survey, I matched survey responses with the demographic data provided by TFDW using the DOD ID number. No unmatched data was used in the

analysis; however, I used the demographics of the non-participants as a comparison with those who chose to participate in the survey.

The TFDW data contained 295 different primary military occupational specialty codes. I created five different categories to capture the large number of primary military occupational specialties. I defined combat arms as the primary military occupational specialties that were previously closed to women. Aviation was comprised of pilots and Naval Flight Officers across all airframes as well as all primary military occupational specialties directly related to aviation according to their occupational field. All remaining primary military occupational specialties were categorized as combat service support. Table 7 provides a detailed list of how I categorized each occupational specialty.

Table 7. Categorization of Primary Military Occupational Specialties

Category	Occupational Field
Combat Arms	Field Artillery Infantry Tank and Assault Amphibious Vehicle
Combat Service Support	Acquisition Management Professional (MOS=8059) Ammunition and Explosive Ordnance Disposal Chemical, Biological, Radiological and Nuclear (CBRN) Defense Combat Camera (COMCAM) Communications Distribution Management Engineer, Construction, Facilities, and Equipment Financial Management First Sergeant/Sergeant Major (MOS=8999) Food Service Ground Electronics Maintenance Ground Ordnance Maintenance Intelligence (except Aviation Intelligence Officers) Legal Services Linguist Logistics Marine Air Ground Task Force (MAGTF) Plans Marine Corps Community Services Military Police, Investigations, and Corrections Motor Transport Music Personnel and Administration Public Affairs

Category	Occupational Field
	Recruiting And Retention Signals Intelligence/Ground Electronic Warfare Supply Administration and Operations Training Utilities
Aviation	Air Control/Air Support/Anti-Air Warfare/Air Traffic Control Aircraft Maintenance Aircraft Maintenance (Fixed-Wing) Aircraft Maintenance (Rotary-Wing) Airfield Services Aviation Command and Control (C2) Electronics Maintenance Aviation Intelligence Officers (MOS=0207) Aviation Logistics Aviation Ordnance Intermediate Avionics Maintenance Meteorology and Oceanography (METOC) Navigation Officer/Enlisted Flight Crews Organizational Avionics Maintenance Pilots/Naval Flight Officers

Similarly, I created six rank variables to categorize the various ranks in my TFDW data. Using the Enlisted Promotions Manual (2006), I defined junior Marines as a Marine serving in the ranks of E1 through E3. A noncommissioned officer was defined as Marines in the ranks of E4 and E5. All remaining enlisted Marines, E6 through E9, were defined as staff noncommissioned officers. Rather than group all junior officers into one category, I chose to break them into two categories. For officers, first and second lieutenants were grouped together while captains were their own category. In recent years, Marines have served in the rank of captain for an average of 6 years. Because officers hold the rank of captain for such a long time, the nature of their decision making may change significantly during that time span as individuals mature. Grouping them together with first and second lieutenants who hold each of those ranks on average for two years reduces the effects on the research data of decisions made in the survey by captains. All remaining officers were grouped as field grade officers mirroring the DOD definition (Department of Defense, n.d.). Table 8 provides the specific rank breakdown.

Table 8. Table of Rank Breakdown

Category	Ranks
Junior Marine	E-1 through E-3
Noncommissioned Officer	E-4 and E-5
Staff Noncommissioned Officer	E-6 through E-9
Lieutenants	O-1 and O-2
Captain	O-3
Field Grade	O-4

Last, I created education variables. Using the U.S. Marine Corps Total Force Systems Codes Manual, I created two education variables based on the data from TFDW. Due to the volume of codes used to capture education levels in the U.S. Marine Corps, I narrowed the education categories for my analysis. During my review of the data, I found 433 Marines without education codes in their records. For the purposes of my analysis, I assumed enlisted Marines with a missing education code possessed a high school diploma. Similarly, I assumed any officer without an education code attained a college degree. My assumption is consistent with the stated requirements published by the U.S. Marine Corps (“Requirements,” n.d.). However, the education codes in TFDW are subject to error. The information resident in TFDW is only as good as the administrative support entering information in a Marine’s record as well as the individual Marine verifying the accuracy of his record. My interpretation of the U.S. Marine Corps Total Force Systems Codes Manual and categorization of a Marine’s education could result in a measurement error. However, I do not think this error significantly impacts my categories as the vast majority of the definitions were straightforward, and I grouped education into two broad categories. Table 9 provides the education categories and educational certifications in TFDW.

Table 9. Education Categories

Education Categories	Educational Certifications
High School Diploma	Less than a high school diploma High school diploma GED or equivalent Adult education diploma High school certificate of attendance Home study diploma Non-traditional high school Occupational program certificate Correspondence school diploma Completed one semester of college Associate's Degree
Bachelor's Degree or Higher	Bachelor's Degree Master's Degree Doctoral Degree

To more thoroughly analyze my results on retirement choices, I added additional data to my master data file. I matched individual military occupational specialties with their civilian counterpart, standard occupational classification (SOC) codes, using data from the National Crosswalk Service Center. Once matched, I used data from the Bureau of Labor Statistics to match the SOC with 2014 average annual earnings. Using the 2014 pay table, I added annually salaries based on individual rank and time in service. I used the 2014 pay chart so the annual salaries from the pay chart and Bureau of Labor Statistics were in 2014 real dollar amounts.

The useable data set includes 28,122 Marines. Variables used in the research are provided in Table 10.

Table 10. Descriptive Statistics of the Sample

	Survey Participants (1)	Survey Non- Participants (2)
Male	0.911 (0.008)	0.922 (0.002)
Married	0.598 (0.014)	0.449 (0.003)
Single	0.402 (0.014)	0.550 (0.003)
Age	26.813 (0.129)	24.112 (0.022)
Junior Marine (E1-E3)	0.113 (0.009)	0.294 (0.003)
NCO (E4-E5)	0.411 (0.015)	0.541 (0.003)
SNCO (E6-E9)	0.199 (0.012)	0.080 (0.002)
Lieutenant (O1-O2)	0.084 (0.008)	0.039 (0.001)
Captain (O3)	0.158 (0.011)	0.041 (0.001)
Field Grade (O4)	0.035 (0.005)	0.006 (0.000)
White	0.819 (0.011)	0.820 (0.002)
Black	0.071 (0.008)	0.092 (0.002)
Other	0.137 (0.010)	0.154 (0.002)
High School Diploma	0.713 (0.013)	0.905 (0.002)
Bachelors Degree or Higher	0.287 (0.013)	0.095 (0.002)
Combat Arms	0.196 (0.012)	0.255 (0.003)
Combat Service Support	0.513 (0.015)	0.453 (0.003)
Aviation	0.291 (0.013)	0.292 (0.003)
Default change behavior index	0.503 (0.017)	
Standard Risk Score	0.021 (0.029)	
AFQT Score	54.586 (0.993)	59.364 (0.142)
GCT Score	116.687 (0.419)	110.484 (0.074)
Observations	1,152	28,053

With those variables and the survey responses, I conducted a survival analysis to determine the length of service probabilities for each retirement system. In the Modernized Retirement System, Marines are faced with multiple retirement decisions. I used probit regression analysis to estimate the probabilities of Marines opting into the new plan, estimated TSP contribution rate, and lump sum options.

IV. RESULTS

With all the data joined together in one master data file, I began my analysis. I first made sure my data was representative of the population of I Marine Expeditionary Force. I conducted the Kaplan-Meier survival analysis of the entire sample then broke down the sample into two groups, officers and enlisted Marines. While conducting the survival analysis, I reviewed the covariates of expected length of service given the two retirement systems for both officers and enlisted Marines. Last, I explored the covariates of the various retirement choices under the Modernized Retirement System.

In order to send the survey recruitment email, I utilized the Manpower Information Systems Division at Headquarters, U.S. Marine Corps to email the survey on my behalf. Providing email addresses to the U.S. Marine Corps is strictly voluntary which impacted the number of Marines receiving the recruitment email. On February 18, 2016, the survey was sent to 28,054 Marines who were assigned to I MEF as of February 6, 2016. The sample size of the survey was 41,615 Marines. Of the sample size, 1,152 Marines participated in the survey, broken down in Tables 11 and 12. Of note, the enlisted respondents drastically under-represented the population. Conversely, the officer respondents better represented the population.

Table 11. Enlisted Survey Participation

Comparison of the # of emails sent to # of respondents - Enlisted									
	Junior Marines			NCO			SNCO		
	# emails sent	# responded	% responded	# emails sent	# responded	% responded	# emails sent	# responded	% responded
Combat Arms	3145	61	1.9%	3016	76	2.5%	400	27	6.8%
Combat Service Sup.	2822	45	1.6%	7896	296	3.7%	1211	134	11.1%
Aviation	2267	24	1.1%	4267	102	2.4%	645	68	10.5%

Table 12. Officer Survey Participation

Comparison of the # of emails sent to # of respondents - Officers									
	Lieutenant			Captain			Field Grade		
	# emails sent	# resp-onded	% resp-onded	# emails sent	# resp-onded	% resp-onded	# emails sent	# resp-onded	% resp-onded
Combat Arms	395	28	7.1%	182	28	15.4%	28	6	21.4%
Combat Service Sup.	423	47	11.1%	305	61	20.0%	42	8	19.0%
Aviation	264	22	8.3%	653	93	14.2%	92	26	28.3%

I first conducted the survival analysis to examine any changes in expected years of service given the different retirement plans. Using the Kaplan-Meier survival estimates, I found a difference in the expected length of service for both the officers and enlisted. I confirmed the difference by examining the kernel density graph and Kolmogorov-Smirnov equality of distributions test. According to the Kolmogorov-Smirnov, Panel B has a p-value of 0.059 and Panel C has a p-value of 0.000. Figures 1 through 3 provide the Kaplan-Meier survival estimates in three separate panels: the entire sample, enlisted, and officers.

Although statistically significant, the differences in expected lengths of service are small in magnitude. For the enlisted Marines, the Modernized Retirement System is inducing young Marines to remain in the U.S. Marine Corps for a longer period of time. At 5 and 8 years of service, enlisted Marines exit the U.S. Marine Corps at a lower rate under the Modernized Retirement System compared to the current retirement system. From 0 to 20 years of service, enlisted Marines, on average, stay in for a longer period of time under the Modernized Retirement System. For officers, the current retirement system is preferred over the Modernized Retirement System. At 4, 8, and 10 years of service, officers exit the U.S. Marine Corps at a higher rate under the Modernized Retirement System compared to the current retirement system.

Interestingly, both officer and enlisted exhibit similar behavior at 12 and 16 years of service. As previously mentioned, the U.S. Marine Corps may offer a continuity bonus at 12 years of service contingent on 4 more years of service. Both Panel B and Panel C experience a drop in manpower at the 12 and 16 years of service. The continuity bonus policy may contribute to Marines desiring to exit the U.S. Marine Corps rather than

commit to an additional 4 years of service. Marines who were offered and elected to receive the continuity bonus can exit the U.S. Marine Corps at 16 years of service. Both Panel B and C reflect a drop in retention at 16 years of service. From 16 years of service to 20 years of service, the manpower levels remain relevantly constant over than 4 year period of time. Enlisted Marines exhibit approximately 2 percentage point difference in manpower levels between the Modernized Retirement System and current retirement system. Officers exhibit a larger difference with approximately 15 percentage point difference in manpower levels across the two retirement systems.

Figure 1. Kaplan-Meier Survival Estimates: All Marines

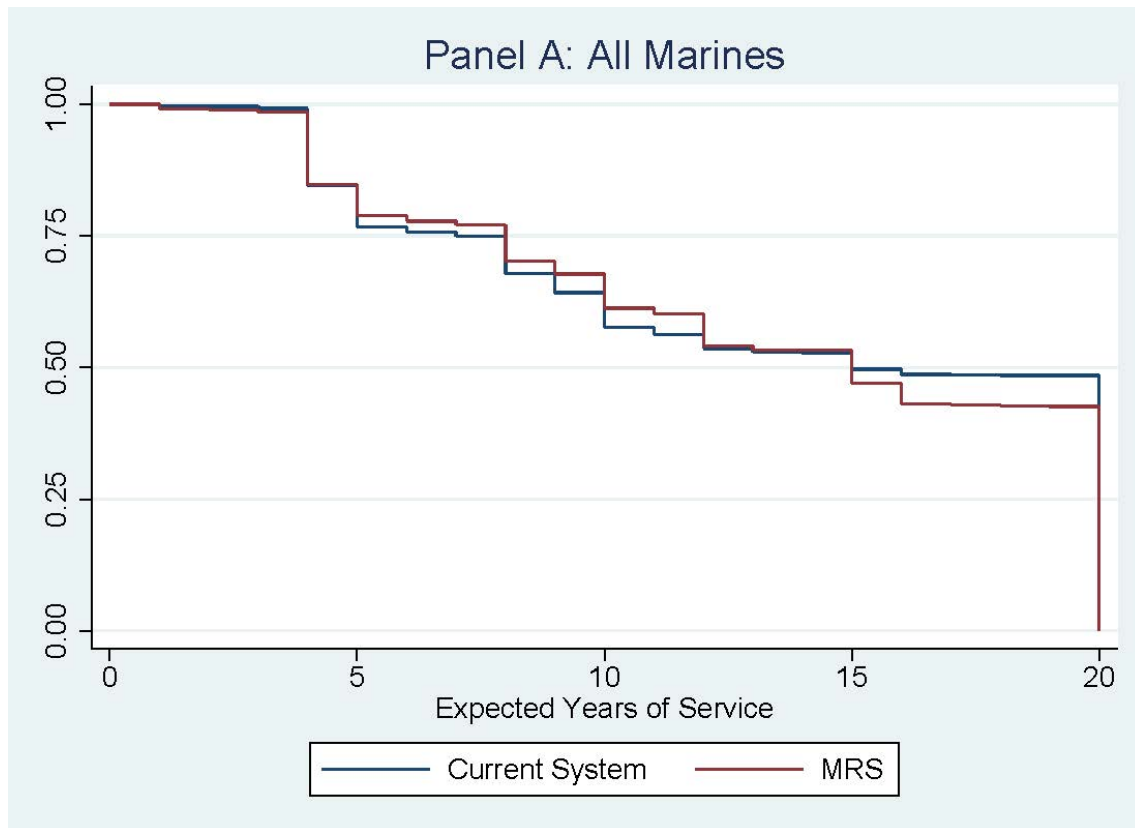


Figure 2. Kaplan-Meier Survival Estimates: Enlisted

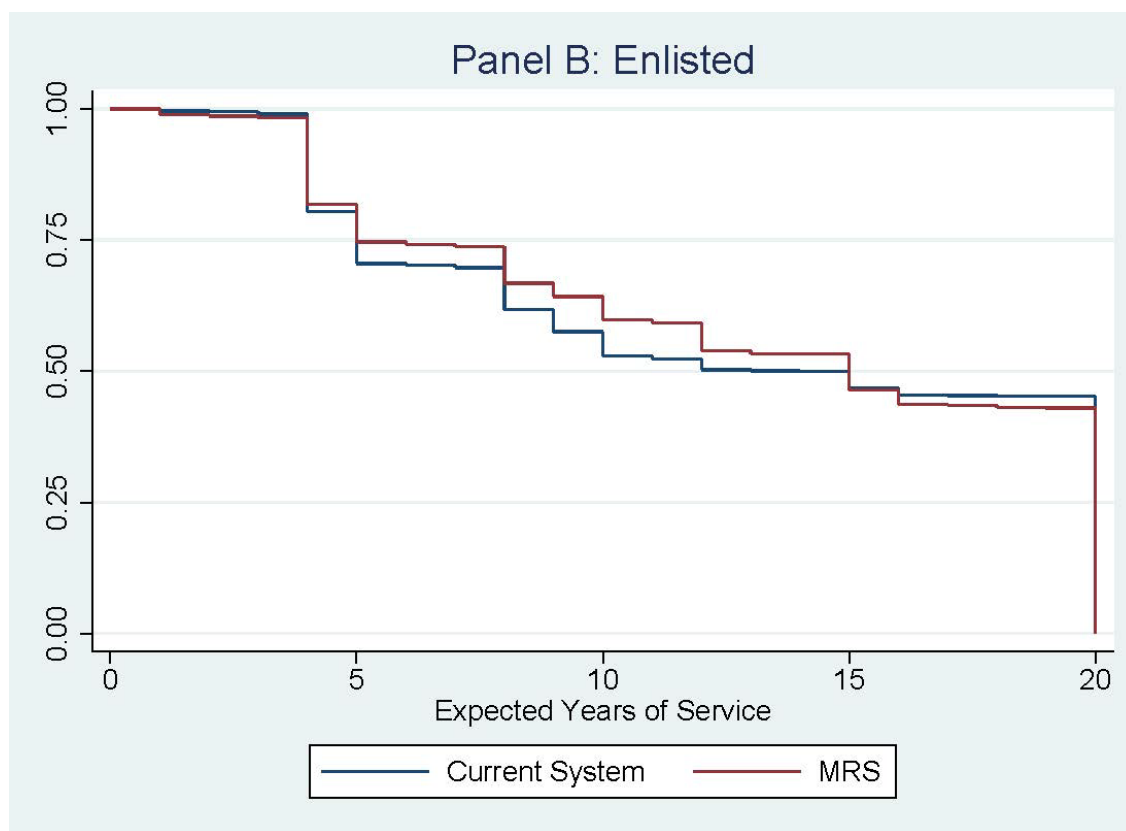
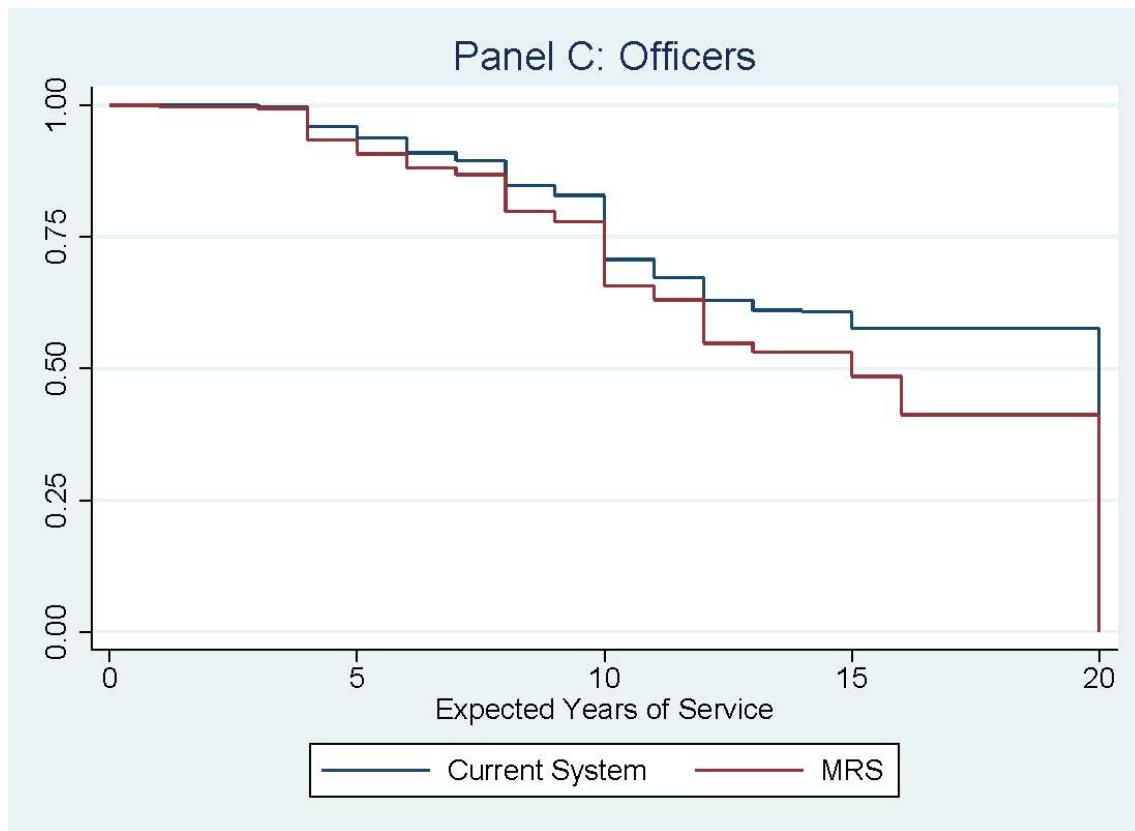


Figure 3. Kaplan-Meier Survival Estimates: Officers



With the retirement plan of the DOD shifting to this modernized approach with both defined contribution and benefit options, I wanted to identify the opt-in rates. This information is of critical importance to the U.S. Marine Corps, and the larger DOD, as it may significantly impact future budgets. Table 13 displays the probit regression output. Figures 4 through 6 display opt-in rates by years of service in three panels: the whole survey population, enlisted, and officers.

Table 13. Opt-in Results

	Enlisted Opt-In	Officer Opt-In
	(1)	(2)
Male	-0.090 (0.064)	-0.063 (0.073)
Married	0.059 (0.040)	-0.057 (0.034)
Age	-0.008 (0.007)	-0.015 (0.007)
Junior Marine (E1-E3)	0.193 (0.080)	
NCO (E4-E5)	0.215 (0.061)	
Lieutenant (O1-O2)		0.926 (0.167)
Captain (O3)		0.603 (0.285)
White	-0.127 (0.095)	0.027 (0.060)
Other	-0.139 (0.097)	-0.040 (0.060)
High School Diploma	-0.065 (0.114)	
Bachelors Degree or higher		0.032 (0.048)
Combat Service Support	0.040 (0.047)	0.038 (0.049)
Aviation	0.112 (0.059)	0.057 (0.052)
Default change behavior index	-0.025 (0.032)	-0.041 (0.029)
Standard Risk Score	0.030 (0.019)	0.034 (0.017)
AFQT Score	0.001 (0.001)	
GCT Score		-0.000 (0.001)
Observations	780	272
Mean	0.458	0.110

Standard Errors in Parenthesis

Reference Variables - Enlisted:

SNCO (E6-E9), Black, Bachelor's Degree, Combat Arms

Reference Variables - Officers:

Field Grade (O4), Black, High School Diploma, Combat Arms

Figure 4. Opt-in Rates by Years of Service: All Marines

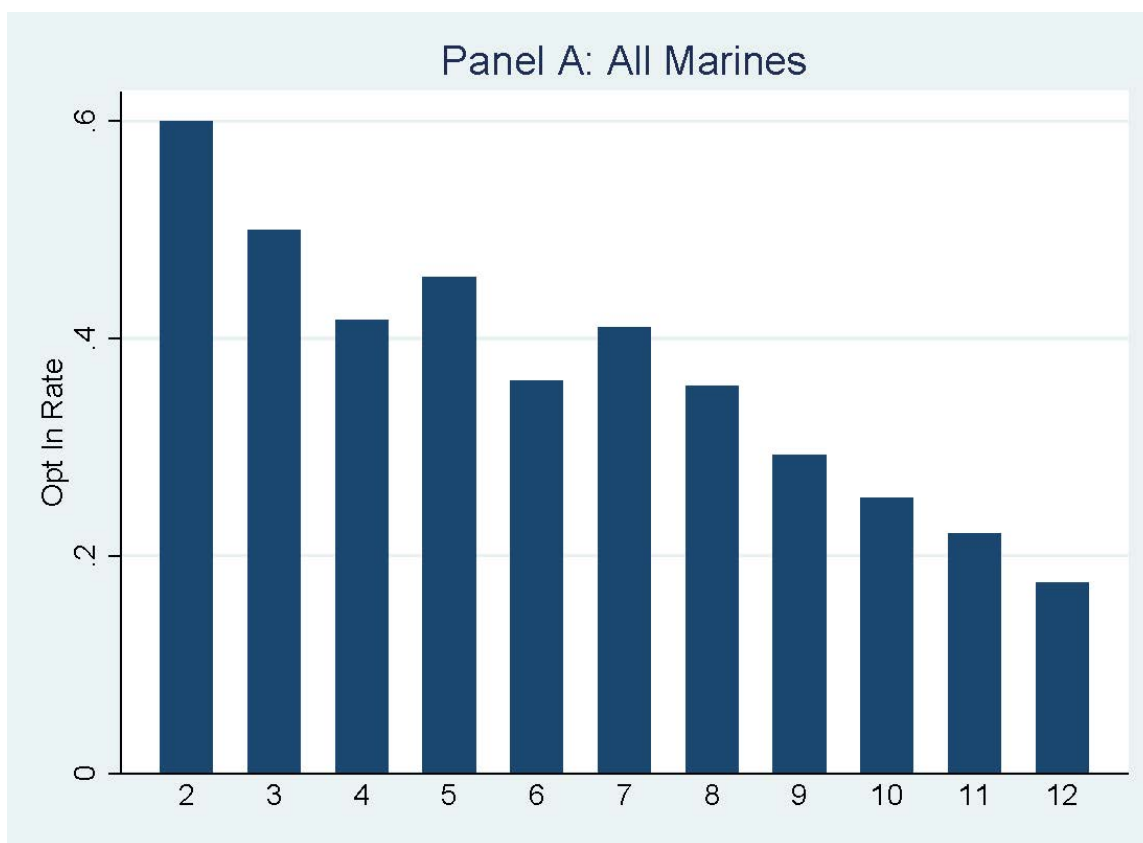


Figure 5. Opt-in Rates by Years of Service: Enlisted

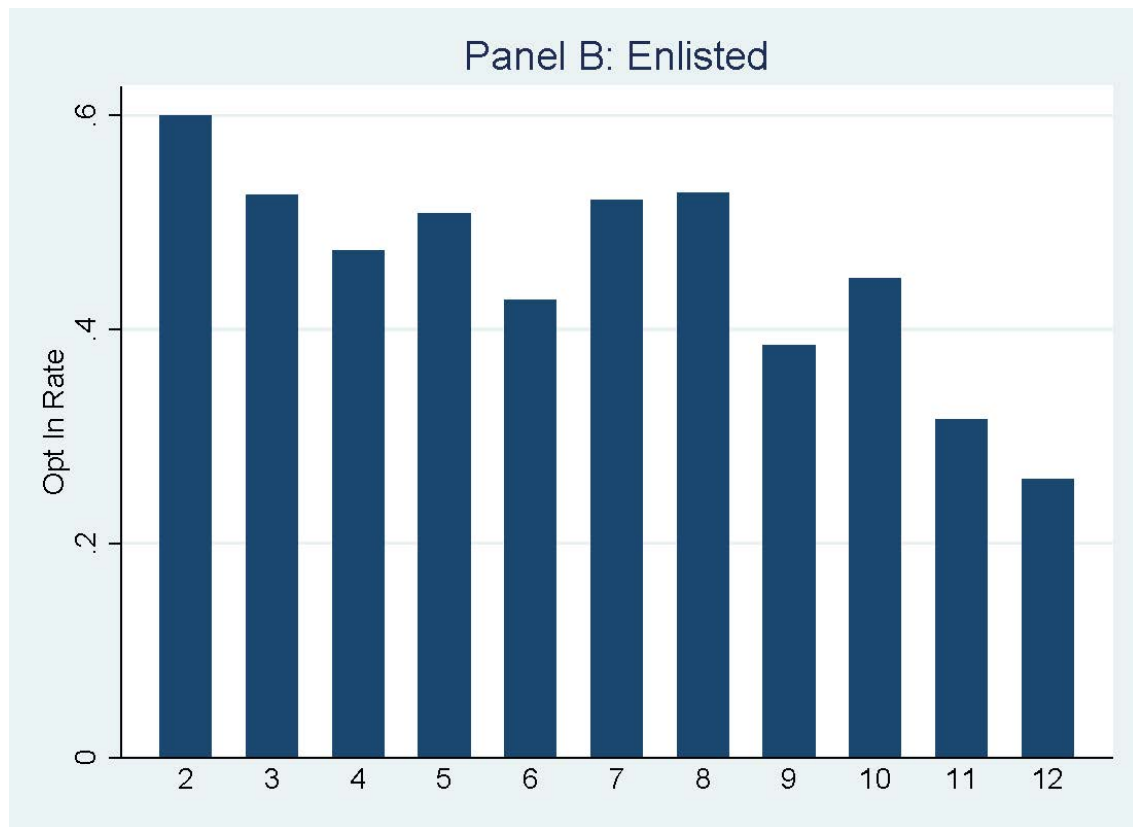
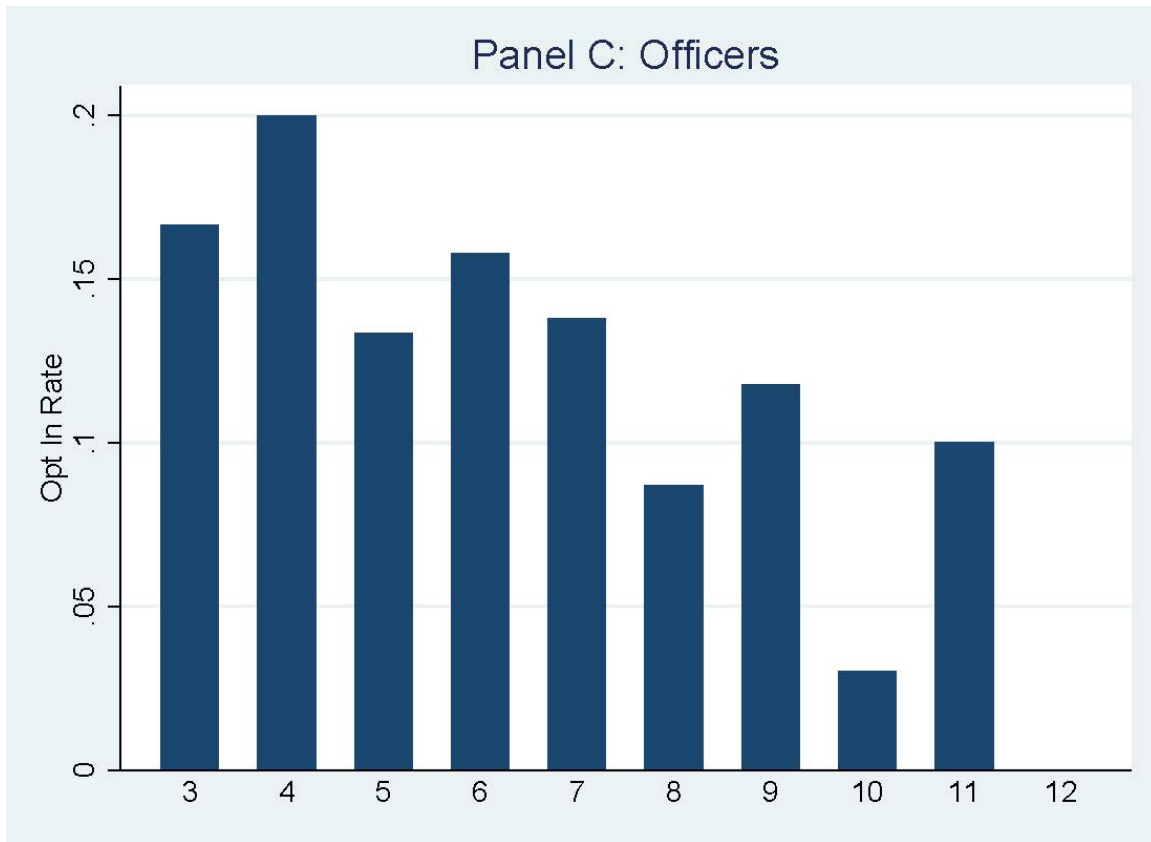


Figure 6. Opt-in Rates by Years of Service: Officers



With the implementation date set for January of 2018, I expected to find younger Marines would choose to opt into the Modernized Retirement System compared to older Marines. According to Table 13, compared to younger survey participants, older participants are less likely to opt into the Modernized Retirement System for both officers and enlisted Marines. As expected, Marines more junior in rank are more likely to opt into the Modernized Retirement System compared to staff noncommissioned officers.

Similar to the opt-in percentages, estimates in lump sum payouts and TSP contribution rates may also have significant impacts on the DOD budget in future years. Table 14 displays the probit regression output of the TSP contribution rate.

Table 14. TSP Participation Rates

	Enlisted			Officer		
	0% TSP	1%-3% TSP	More than 5% TSP	0% TSP	1%-3% TSP	More than 5% TSP
	Participation (1)	Participation (2)	Participation (3)	Participation (4)	Participation (5)	Participation (6)
Male	0.003 (0.020)	0.000 (0.044)	0.035 (0.056)	-0.074 (0.105)	-0.000 (0.002)	-0.010 (0.106)
Married	-0.026 (0.014)	-0.031 (0.028)	0.095 (0.035)	-0.033 (0.034)	-0.000 (0.002)	-0.089 (0.058)
Age	0.002 (0.002)	-0.004 (0.005)	-0.003 (0.006)	-0.003 (0.005)	0.000 (0.000)	0.003 (0.012)
Junior Marine (E1-E3)	0.020 (0.034)	-0.057 (0.049)	0.058 (0.067)			
NCO (E4-E5)	0.021 (0.019)	-0.022 (0.042)	-0.003 (0.050)			
Lieutenant (O1-O2)					0.849 (0.321)	-0.098 (0.125)
Captain (O3)				-0.007 (0.041)	0.298 (0.289)	-0.037 (0.093)
White	0.201 (0.021)	0.044 (0.056)	-0.111 (0.069)	-0.038 (0.081)	0.008 (0.010)	0.084 (0.118)
Other	0.981 (0.001)	0.045 (0.079)	-0.093 (0.095)		0.947 (0.047)	-0.080 (0.144)
High School Diploma	0.023 (0.021)	-0.044 (0.090)	-0.077 (0.086)			
Bachelors Degree or higher					-0.002 (0.006)	0.100 (0.105)
Combat Service Support	-0.009 (0.015)	-0.079 (0.032)	0.094 (0.040)	-0.050 (0.023)	0.003 (0.005)	0.041 (0.077)
Aviation	-0.022 (0.014)	-0.053 (0.033)	0.064 (0.045)	-0.039 (0.033)	-0.000 (0.002)	0.040 (0.074)
Default change behavior index	-0.009 (0.010)	0.035 (0.021)	-0.019 (0.027)	0.001 (0.023)	-0.001 (0.002)	-0.030 (0.050)
Standard Risk Score	-0.004 (0.006)	-0.022 (0.013)	0.036 (0.016)	-0.006 (0.013)	-0.002 (0.002)	0.009 (0.029)
AFQT Score	-0.000 (0.000)	-0.003 (0.001)	0.003 (0.001)			
GCT Score				0.001 (0.001)	-0.000 (0.000)	0.002 (0.002)
Observations	921	921	921	197	319	319
Mean	0.062	0.173	0.709	0.025	0.028	0.288

Standard Errors in Parenthesis

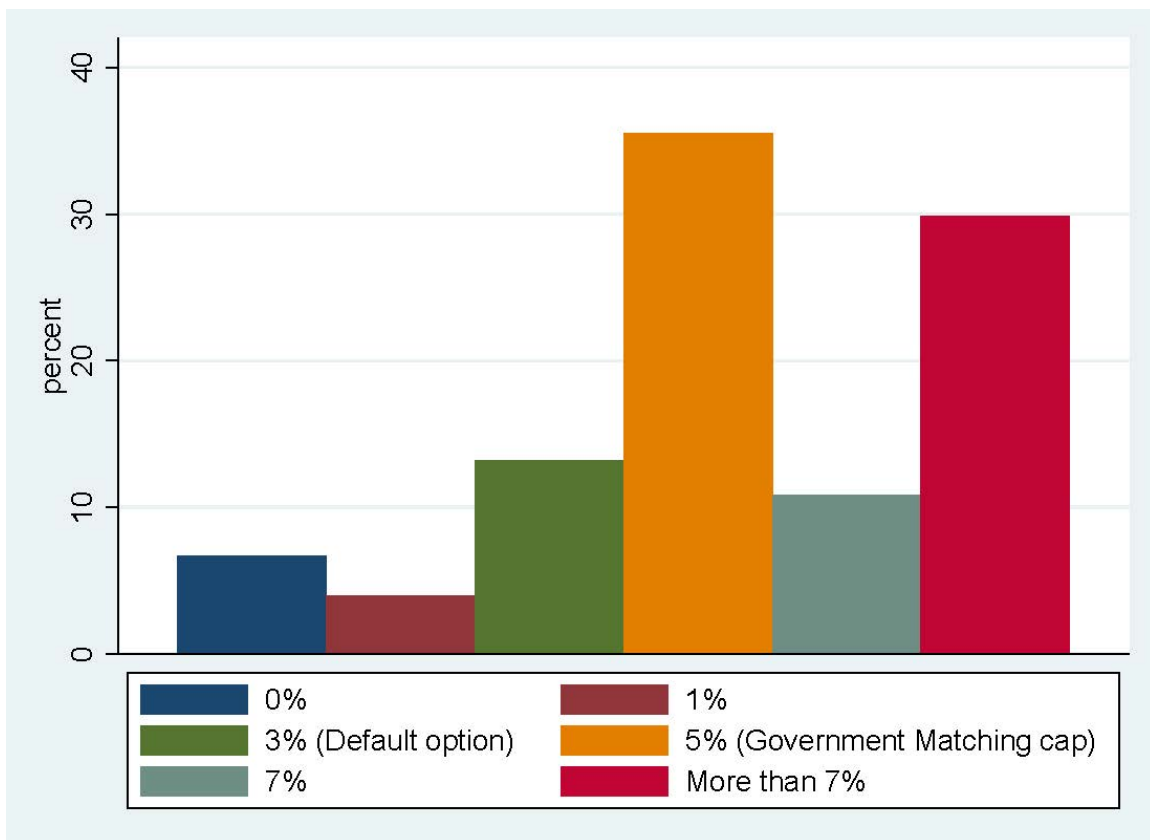
Reference Variables: SNCO (E6-E9), Black, Bachelor's Degree, Combat Arms

Reference Variables - Officers: Field Grade (O4), Black, High School Diploma, Combat Arms

Unfortunately, as shown in Table 14, the results are largely inconclusive. Very few variables are statistically significant; however, some inferences can be extrapolated from the results. Table 14 shows there is a lot of evidence Marines will shift from the default participant rate of 3%. That is an important finding for future budgeting concerns from the U.S. Marine Corps and larger DOD.

Figure 7 displays the percentages of individual TSP contribution rates using the rates found in the survey.

Figure 7. Individual TSP Contribution Rates



Last, I estimated the covariates on the lump sum option opportunity provided by the Modernized Retirement System. I first estimated whether or not any lump sum option was taken. Then, given a lump sum was taken, I estimated the probability the Marine would take the 50% lump sum option. Table 15 displays the probit regression output of the lump sum option.

Table 15. Lump Sum

	Enlisted		Officer	
	Any Lump Sum	50% Lump Sum Given Any Lump Sum	Any Lump Sum	50% Lump Sum Given Any Lump Sum
	(1)	(2)	(3)	(4)
Male	-0.079 (0.060)	-0.011 (0.081)	0.031 (0.104)	0.318 (0.186)
Married	0.003 (0.038)	-0.095 (0.053)	0.086 (0.059)	-0.017 (0.127)
Age	-0.013 (0.007)	-0.008 (0.010)	0.005 (0.012)	0.008 (0.025)
Junior Marine (E1-E3)	0.167 (0.077)	-0.156 (0.101)		
NCO (E4-E5)	0.075 (0.056)	-0.112 (0.086)		
Lieutenant (O1-O2)			0.323 (0.146)	0.284 (0.292)
Captain (O3)			0.093 (0.100)	0.130 (0.223)
White	-0.084 (0.082)	-0.085 (0.115)	-0.076 (0.142)	0.403 (0.208)
Other	0.006 (0.091)	0.024 (0.123)	-0.034 (0.155)	0.155 (0.336)
High School Diploma	-0.144 (0.098)	-0.086 (0.146)		
Bachelors Degree or higher			-0.060 (0.134)	0.103 (0.270)
Combat Service Support	-0.024 (0.045)	-0.002 (0.060)	0.029 (0.080)	0.472 (0.125)
Aviation	-0.030 (0.054)	0.012 (0.077)	0.026 (0.078)	0.384 (0.141)
Default change behavior index	0.010 (0.030)	-0.048 (0.042)	-0.008 (0.052)	-0.079 (0.108)
Standard Risk Score	0.030 (0.018)	-0.002 (0.025)	0.026 (0.031)	0.126 (0.063)
AFQT Score	-0.004 (0.001)	-0.002 (0.001)		
GCT Score			0.002 (0.002)	0.006 (0.006)
Observations	921	437	319	110
Mean	0.474	0.175	0.345	0.176

Standard Errors in Parenthesis

Reference Variables: SNCO (E6-E9), Black, Bachelor's Degree, Combat Arms

Reference Variables - Officers: Field Grade (O4), Black, High School Diploma, Combat Arms

Similarly to the TSP participation rates, the results for the lump sum option were inconclusive. Although not statistically significant, I found that married Marines are more likely to take a lump sum option compared to single Marines. An interesting note is the standardized risk variable. Although not statistically significant, the larger the propensity for risk, the more likely an individual will take any lump sum option. Like the TSP contribution rate, important economic inferences can be made from the results.

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V. CONCLUSIONS

The current military retirement system is an outdated method of compensating service members. Although very generous for the individuals receiving the benefits, the vast majority of military service members do not serve long enough to be eligible for retirement benefits. Further, the millennial generation prefers to frequently change jobs before settling on their career (Asch, Hosek, & Mattock, 2014, p. vi). Implementing the Modernized Retirement System provides some form of retirement benefit for all service members while retaining a generous defined benefit for those serving a minimum for 20 years in the military. Additionally, the Modernized Retirement System provides a force retention measure in the form of the continuity bonus.

My research shows U.S. Marine Corps officer manpower levels will not be significantly affected with the establishment of the Modernized Retirement System. However, enlisted Marines exhibited a statistically significant difference in manpower levels across the current system and the Modernized Retirement System. This finding may have impacts on recruiting and retention policies and procedures within the U.S. Marine Corps. Separately, the Modernized Retirement System may incentivize a larger portion of the millennial generation to join the military service. Under the Modernized Retirement System, all service members depart the military with some form of retirement savings.

My research provides a general understanding for expected behavior in participation in the Thrift Savings Plan, lump sum behaviors, and opt-in rates for officers and enlisted Marines. These three options provided by the Modernized Retirement System play a critical role in future budgeting. I found the majority of survey participants will contribute 5% to their Thrift Savings Plan to receive the maximum government matching opportunity. I found that officers and enlisted Marines currently serving in their initial contract are more likely to opt into the Modernized Retirement System compared to more senior Marines. As the U.S. Marine Corps continues to plan for the implementation date of January 1, 2018, the results from my survey provide useful budgeting tools for the future year defense plans.

My research was not all-encompassing and did not exhaust all opportunities for research in this area. If cost savings truly remains a concern for the Department of Defense, further research could be conducted on more aggressive policy changes to the military retirement system. If the DOD changed the retirement system and paid retirement annuities only when retirees reached retirement age, I suspect the government would save a considerable amount of money. If that is not a viable option, Congress should perhaps consider structuring the DOD's retirement system like the private sector in further reducing the defined benefit aspect of retirement and increase the defined contribution aspect.

An ex-post analysis should be done in future years to analyze the true effects of the shift in military retirement. The ex-post analysis should include the opt-in rates exhibited across all services as that provides relevant information applicable to private sectors. The analysis should also include the Thrift Savings Plan behaviors for financial planning. With data based on actual results rather than hypothetical results, the DOD can better forecast the trends of TSP costs.

APPENDIX. RETIREMENT SURVEY

Introduction. A new military retirement plan was approved by President Obama on 25 November 2015 to begin as early as 2018. This online survey will assist the Marine Corps in determining the retention impacts of the new retirement plan. The information provided in this survey is not endorsed by the Marine Corps. The modernized retirement system presented in the survey is the current understanding of the future retirement system but may not be what is ultimately implemented in 2018. You can participate in the survey during on and off duty hours and will be available for 1 month. Your survey responses will be combined with portions of your personnel record for this research using your EDIPI. Once your responses are matched with your demographic information provided by the Total Force Data Warehouse, the EDIPI will be deleted from the research.

Time requirement. Approximately 20 minutes.

Potential Risks and Discomforts. The potential risk of participating in this study is an unauthorized disclosure of survey responses. The risk of a loss of confidentiality is minimal; outside information not collected in this survey is required to match you with your EDIPI.

Anticipated Benefits. This survey will provide critical information to the Marine Corps on military compensation. You may directly benefit from your participation in this research by learning about the proposed changes to the military retirement system enabling you to make a more informed decision regarding your retirement.

Voluntary Nature of the Study. Your participation in this study is strictly voluntary. If you choose to participate you can change your mind at any time and withdraw from the study. You will neither be penalized in any way nor lose any benefits to which you would otherwise be entitled if you choose not to participate in or withdraw from this study. The alternative to participating in the research is to not participate in the research.

Confidentiality & Privacy Act. Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All reasonable efforts will be made to safeguard your personal information; however, total confidentiality cannot be guaranteed. Any identifiable information will be destroyed at the completion of the research. All data collected from this survey will be stored on the secure servers of the Naval Postgraduate School.

Points of Contact. If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study please contact Greg Moynihan at gtmoynih@nps.edu or Dr. Jesse Cunha at jcunha@nps.edu. If you have any questions regarding your rights as a research

subject, please contact the Naval Postgraduate School Internal Review Board Chairman, Dr. Lawrence G. Shattuck at lgshattu@nps.edu or 831-656-2473.

Statement of Consent. I have read and understand the information provided above. I have been given the opportunity to ask questions and all the questions have been answered to my satisfaction. I may print a copy of this form for my records and I agree to participate in this study. I understand that by agreeing to participate in this research, I do not waive any of my legal rights.

I consent to participate in the research.

I do not consent to participate in the research.

SECTION I. BACKGROUND

1. Are you an officer or enlisted Marine?
 - a. Officer
 - b. Enlisted
2. Please provide your EDIPI.
**Text box fill-in
3. When signing up for a website, do you:
 - a. Keep the box checked to be enrolled in newsletters and emails from the website
 - b. Uncheck the box to avoid receiving newsletters and emails from the website
4. You just bought a new laptop computer, do you:
 - a. Keep the factory settings
 - b. Adjust the factory settings
5. How would your friends describe you?
 - a. Jumps headfirst into things
 - b. Does a little research before taking any risks
 - c. Careful
 - d. Avoids risks entirely
6. Would you rather:
 - a. Take \$1,000 in cash now
 - b. Have a 50% chance of getting \$5,000
 - c. Have a 25% chance of getting \$10,000
 - d. Have a 5% chance of getting \$100,000
7. Imagine you are three weeks away from taking a “once in a lifetime” vacation and you lose your job. What would you do?
 - a. Cancel the vacation.
 - b. Take a more modest vacation
 - c. Go as scheduled
 - d. Extend your vacation because you don’t know if you will ever be able to travel first class again.
8. If you had \$20,000 to invest, would you:
 - a. Deposit the money in a bank or purchase a certificate of deposit
 - b. Invest in safe high quality bonds or bond mutual funds
 - c. Invest in the stocks or stock market funds
9. How would you describe your comfort-level of risky investing?
 - a. Not at all comfortable
 - b. Somewhat comfortable
 - c. Very comfortable

SECTION II. CURRENT RETIREMENT PLAN

Please read the following information and answer the questions below.

The current military retirement system allows service members to receive a pension after a minimum of 20 years of military service. The Department of Defense provides the following two options:

High-3: A Marine receives 50% of his/her average pay for the last 3 years of service, taxed as ordinary income.

REDUX: A Marine receives 40% of his/her average pay for the last 3 years of service, taxed as ordinary income. In addition, the REDUX plan also provides a lump sum of \$30,000 (approximately \$21,000 after taxes) at the 15th year of service.

Monthly Pension Payments

Calculated from the 2015 military pay chart

RANK AT 20 YEARS OF SERVICE	MONTHLY PENSION	
	HIGH-3	REDUX
E-6	\$1,900	\$1,500
E-7	\$2,200	\$1,800
E-8	\$2,400	\$1,900
E-9	\$2,800	\$2,200
O-4	\$3,700	\$3,000
O-5	\$4,200	\$3,300

If you do not reach 20 years of service, you do not receive a pension.

10. If you serve to 15 years of service, you will be required to make a choice between High-3 and REDUX. Which plan do you think you would choose?

- a. High-3
- b. REDUX

11. How many years of service do you expect to have when you separate from the Marine Corps?

**Answer range from 1 – 20+ years

SECTION III. NEW RETIREMENT PLAN

Please read the following information and answer the questions below.

The new retirement plan has four key changes. A brief summary of the changes is provided below with more detailed information beneath the questions.

Change 1: Upon retirement with at least 20 years of service, monthly pension payments would equal the amounts listed under the REDUX plan (refer to table above). As currently, the payments would be taxed as ordinary income.

Change 2: The Marine Corps has introduced a defined contribution portion of the retirement compensation package. Upon entering the Marine Corps, the government would automatically establish a transfer of 3% of a Marine's pay into the Thrift Savings Plan (TSP). The government would also deposit an amount equal to 1% of a Marine's pay into the TSP. At 2 years of service, the government would begin matching the Marine's contributions to the TSP up to 5% of pay.

Change 3: At 12 years of service, the military will provide a continuation bonus contingent on serving 4 more years of service. The bonus amounts to 2.5 times a service member's monthly basic pay, taxed as ordinary income.

Change 4: Under the new retirement plan, Marines have the option of receiving a portion of their pension as a lump sum. In particular, a Marine can choose to receive at retirement a lump sum payment of either 25% or 50% of the pension payments they would have received through 67 years of age. If a lump sum option is chosen, monthly pension amounts will be reduced by 25% or 50% until age 67.

[Please click here for more information about the new retirement plan.](#)

Questions about new retirement

12. Would you like more information regarding the new retirement plan?

- a. Yes
- b. No

13. After reading this information, how well do you understand the current and new retirement plans?

- 4 - Understand completely
- 3 - Understand well, but have a few questions
- 2 - Slightly confused, have many questions
- 1 - Very confused, do not understand at all

14. If you were subject to the new retirement plan, how many years of service would you expect to complete before separating from the Marine Corps?

**Answer range from 1 – 20+ years

15. Under the new retirement plan, you may have the option to opt into the new plan or remain under the current retirement plan. Which option would you choose?

- a. Opt into the new plan
- b. Remain under the current plan

16. If you were under the new plan (whether you chose to be under it or not) what percent of your salary would you contribute to TSP?

- a. 0%
- b. 1%
- c. 3%
- d. 5%
- e. 7%
- f. More than 7%

17. If offered the above lump sum payment and monthly pension, what would you do?

- a. I would not take the lump sum option
- b. I would choose to take 25% as a lump sum
- c. I would choose to take 50% as a lump sum

18. Do you feel that the information provided in this survey was sufficient for you to make informed choices regarding your retirement?

- a. Yes
- b. No

MORE INFORMATION REGARDING THE NEW RETIREMENT PLAN

Change 1: Upon retirement with at least 20 years of service, monthly pension payments would equal the amounts listed under the REDUX plan (refer to table above). As currently, the payments would be taxed as ordinary income.

Change 2: A retirement savings plan will be introduced, which includes both contributions from the individual Marine as well as contributions from the government. The retirement savings plan will be using the Thrift Savings Plan (TSP). Upon entering the Marine Corps, the government would automatically establish a transfer of 3% of a Marine's pay into the TSP – this is the Individual Contribution. A Marine can adjust their individual contribution after their first financial education course. The government would also deposit an amount equal to 1% of a Marine's pay into the TSP – this is the Government Contribution.

At 2 years of service, the government would begin matching the Marine's contributions to the TSP up to 5% of pay. For example, if a Marine deposited 3% of their monthly pay to the TSP, the government would deposit an additional matching 3% into the Marine's TSP. If, at any time, a Marine chooses to opt out of the TSP contribution, the government will continue to provide 1% of the Marine's basic pay into the Marine's TSP account.

Individual Marines can choose how to invest their contributions in the TSP account. If you choose a safe investment, you have less of a chance of losing your investment, but you also will likely have a low rate of return; if you choose a less-safe investment, you are exposing your investment to more risk of losses, but you also have the chance to make a higher rate of return.

Therefore, under the new retirement plan there would be two choices to make: (1) What percent of your monthly pay to contribute to your TSP, and (2) What type of investment you will make with your contributions. The tables below provide estimated TSP balances you would have at retirement if you began the new plan on 1 January 2018 for several different investment types and individual contribution rates.

RISK AND RETURN INVESTMENT TABLES

Note: The following tables' monthly pension figures were calculated from the 2015 military pay chart. The percentage listed at the top of the table is the individual Marine's contribution. The monetary value captures the individual contribution as well as the government's contribution. For example, if you contribute 1% to your TSP, the government will provide an additional 1% until you either retire or leave the Marine Corps. If you contribute 5% to your TSP, the government will provide 1% of your monthly pay from the start of your active duty until 2 years' time in service. From 2 years onward, the government provides the 5% of your monthly pay until you retire or leave the Marine Corps. All those variations are captured in the final table.

LOW RISK AND LOW RETURN INVESTMENT

Enlisted:

On average, this investment has a **5%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **1%** and **9%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$4,500	\$11,500	\$18,500	\$23,000
Then you will have, on average, this amount of money at 8 YOS:	\$10,100	\$28,100	\$46,100	\$56,100
Then you will have, on average, this amount of money at 12 YOS:	\$16,100	\$46,100	\$76,200	\$92,300
Then you will have, on average, this amount of money at 16 YOS:	\$22,500	\$65,500	\$108,500	\$131,000
Then you will have, on average, this amount of money at 20 YOS:	\$29,200	\$85,500	\$141,800	\$171,000

Officer:

On average, this investment has a **5%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **1%** and **9%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$8,200	\$21,000	\$33,900	\$43,000
Then you will have, on average, this amount of money at 8 YOS:	\$19,200	\$54,200	\$89,100	\$110,900
Then you will have, on average, this amount of money at 12 YOS:	\$30,000	\$86,400	\$142,900	\$176,800
Then you will have, on average, this amount of money at 16 YOS:	\$41,300	\$120,400	\$199,500	\$246,400
Then you will have, on average, this amount of money at 20 YOS:	\$52,700	\$154,600	\$256,500	\$316,400

MEDIUM RISK AND MEDIUM RETURN INVESTMENT

Enlisted:

On average, this investment has a **7%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **-11%** and **25%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$6,300	\$15,900	\$25,500	\$31,800
Then you will have, on average, this amount of money at 8 YOS:	\$13,400	\$37,300	\$61,100	\$74,600
Then you will have, on average, this amount of money at 12 YOS:	\$20,600	\$58,900	\$97,200	\$117,900
Then you will have, on average, this amount of money at 16 YOS:	\$27,800	\$80,400	\$133,000	\$160,800
Then you will have, on average, this amount of money at 20 YOS:	\$34,700	\$101,000	\$167,300	\$202,000

Officer:

On average, this investment has a **7%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **-11%** and **25%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$11,300	\$29,100	\$46,800	\$60,000
Then you will have, on average, this amount of money at 8 YOS:	\$25,600	\$71,900	\$118,100	\$148,400
Then you will have, on average, this amount of money at 12 YOS:	\$38,500	\$110,400	\$182,400	\$228,100
Then you will have, on average, this amount of money at 16 YOS:	\$51,000	\$148,100	\$245,200	\$305,900
Then you will have, on average, this amount of money at 20 YOS:	\$62,800	\$183,300	\$303,900	\$378,600

HIGH RISK AND HIGH RETURN INVESTMENT

Enlisted:

On average, this investment has a **10%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **-15%** and **35%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$10,200	\$25,600	\$41,100	\$51,300
Then you will have, on average, this amount of money at 8 YOS:	\$20,600	\$56,700	\$92,900	\$113,500
Then you will have, on average, this amount of money at 12 YOS:	\$30,000	\$84,900	\$139,800	\$169,800
Then you will have, on average, this amount of money at 16 YOS:	\$38,300	\$109,900	\$181,600	\$219,900
Then you will have, on average, this amount of money at 20 YOS:	\$45,500	\$131,400	\$217,300	\$262,800

Officer:

On average, this investment has a **10%** return per year, but there is a 2 out of 3 chance that the return in any year will be anywhere between **-15%** and **35%**.

If you contribute this percent of your monthly pay to the TSP:	1%	3%	5%	7%
Then you will have, on average, this amount of money at 4 YOS:	\$18,300	\$46,700	\$75,100	\$97,900
Then you will have, on average, this amount of money at 8 YOS:	\$39,100	\$109,000	\$178,900	\$228,300
Then you will have, on average, this amount of money at 12 YOS:	\$55,900	\$159,300	\$262,700	\$333,500
Then you will have, on average, this amount of money at 16 YOS:	\$70,500	\$203,100	\$335,800	\$425,400
Then you will have, on average, this amount of money at 20 YOS:	\$82,700	\$239,800	\$397,000	\$502,300

Note: Not included in the calculations, TSP distributions are subject to state and federal income taxes at the time of payment. The monetary amounts listed in the above tables represent the balance of a TSP account at 20 years of service regardless of length of service. Marines are eligible to receive TSP payments at 59 and one-half years of age; however, a Marine may elect to receive TSP payments earlier but are subject to a 10% penalty tax in addition to other income taxes.

Change 3: At 12 years of service, the military will provide a continuation bonus contingent on serving 4 more years of service. The bonus amounts to 2.5 times a service member's monthly basic pay, taxed as ordinary income. The below table provides estimated values for a continuation bonus.

RANK AT 12 YEARS OF SERVICE	CONTINUATION PAY
E-6	\$8,900
E-7	\$9,900
O-4	\$17,500

Note: The monthly pension figures were calculated from the 2015 military pay chart and average promotion rates according to HQMC. The amounts above are subject to federal and state income taxes.

Change 4: Under the new retirement plan, Marines have the option of receiving a portion of their pension as a lump sum. In particular, a Marine can choose to receive at retirement a lump sum payment of either 25% or 50% of the pension payments they would have received through 67 years of age. If a lump sum option is chosen, monthly pension amounts will be reduced by 25% or 50% until age 67. At 67 years of age, all Marines will receive 100% of their entitled monthly pay regardless of whether they opted to receive the lump sum payment. The table below provides the lump sum payment amounts and monthly payments under the lump sum option.

	25% LUMP SUM AMT	MONTHLY PENSION	50% LUMP SUM AMT	MONTHLY PENSION
E-6	\$72,300	\$1,100	\$144,500	\$800
E-7	\$86,700	\$1,400	\$173,400	\$900
E-8	\$91,500	\$1,400	\$183,100	\$1,000
E-9	\$106,000	\$1,700	\$212,000	\$1,100
O-4	\$128,500	\$2,300	\$257,100	\$1,500
O-5	\$141,400	\$2,500	\$282,800	\$1,700

Note: The tables' figures were calculated from the 2015 military pay chart for a Marine who retired at 20 years of service. Age of retirement for enlisted personnel used in the above table is 38 years of age. Age of retirement for officers used in the above table is 44 years of age. A 7% discount rate was used for the lump sum calculation based on OMB Circular A-94. The amounts above are subject to federal and state income taxes.

SECTION IV. MISCELLANEOUS

19. Do you currently contribute to your TSP account?

- a. Yes
- b. No

20. If so, what percentage of your pay do you contribute?

**Text box fill-in

21. If you are married, does your spouse currently work?

- a. Yes
- b. No
- c. Not applicable

22. What is your total household income, including your income (whether from the Marine Corps or another source) and any other dependents' incomes?

- a. Less than \$10,000
- b. \$10,000 - \$19,999
- c. \$20,000 - \$29,999
- d. \$30,000 - \$49,999
- e. \$50,000 - \$59,999
- f. \$60,000 - \$69,999
- g. \$70,000 - \$79,999
- h. \$80,000 - \$89,999
- i. \$90,000 - \$99,999
- j. \$100,000 - \$109,999
- k. \$110,000 - \$119,999
- l. \$120,000 - \$129,999
- m. \$130,000 - \$139,999
- n. \$140,000 - \$149,999
- o. \$150,000 - \$159,999
- p. \$160,000 - \$169,999
- q. \$170,000 - \$179,999
- r. \$180,000 - \$189,999
- s. \$190,000 - \$199,999
- t. \$200,000 - \$209,999
- u. \$210,000 - \$219,999
- v. \$220,000 - \$229,999
- w. \$230,000 - \$239,999
- x. \$240,000 - \$249,999
- y. More than \$250,000

23. If you left the military today, what job sector would you most likely work in?
Examples of particular professions are provided in parenthesis.

- a. Management, Business, Science, and Arts (Corporate and Business manager/CEO)
- b. Financial Specialists (Accountant, Tax Preparer, Financial Analyst)
- c. Computer and Mathematical (Software Programmer/Developer, Actuary, Statistician)
- d. Architecture and Engineering (Architects/Surveyor, Aerospace/Chemical/Civil Engineer)
- e. Life, Physical, and Social Science (Biologist, Chemist, Psychologist, Economist)
- f. Community and Social Services (Social Worker, Lawyer, Paralegal, Clergy)
- g. Education, Training, and Library (Teacher/Professor, Librarian)
- h. Arts, Design, Entertainment, Sports, and Media (TV/Radio producer, Photographer, Public Relations)
- i. Healthcare Practitioners and Support (Doctor, Nurse, Dentist, Veterinarian, Physician Assistant)
- j. Protective Service (Law Enforcement, Corrections Officer, Fire Fighter, Animal Control, Private Investigator)
- k. Personal Care and Service (Chef, Bartender, Barber, Cosmetologist, Fitness Coach)
- l. Office and Administrative Support (Clerical/Administrator, Human Resources Assistant, Post Office Worker)
- m. Farming, Fishing, and Forestry (Farmer, Agricultural Inspector, Forest and Conservation Worker)
- n. Construction (Carpenter, Construction Laborer, Electrician)
- o. Transportation and Material Moving (Pilot, Logistician, Mass Transit Work/Operator)
- p. Don't know

24. How much would your annual salary be in the civilian sector if you left the military today?

- a. Less than \$10,000
- b. \$10,000 - \$19,999
- c. \$20,000 - \$29,999
- d. \$30,000 - \$49,999
- e. \$50,000 - \$59,999
- f. \$60,000 - \$69,999
- g. \$70,000 - \$79,999
- h. \$80,000 - \$89,999
- i. \$90,000 - \$99,999
- j. \$100,000 - \$109,999
- k. \$110,000 - \$119,999
- l. \$120,000 - \$129,999
- m. \$130,000 - \$139,999

- n. \$140,000 - \$149,999
- o. \$150,000 - \$159,999
- p. \$160,000 - \$169,999
- q. \$170,000 - \$179,999
- r. \$180,000 - \$189,999
- s. \$190,000 - \$199,999
- t. \$200,000 - \$209,999
- u. \$210,000 - \$219,999
- v. \$220,000 - \$229,999
- w. \$230,000 - \$239,999
- x. \$240,000 - \$249,999
- y. More than \$250,000

25. If you were not in the Marine Corps, how much would your dependents earn annually?

- a. Not Applicable
- b. Less than \$10,000
- c. \$10,000 - \$19,999
- d. \$20,000 - \$29,999
- e. \$30,000 - \$49,999
- f. \$50,000 - \$59,999
- g. \$60,000 - \$69,999
- h. \$70,000 - \$79,999
- i. \$80,000 - \$89,999
- j. \$90,000 - \$99,999
- k. \$100,000 - \$109,999
- l. \$110,000 - \$119,999
- m. \$120,000 - \$129,999
- n. \$130,000 - \$139,999
- o. \$140,000 - \$149,999
- p. \$150,000 - \$159,999
- q. \$160,000 - \$169,999
- r. \$170,000 - \$179,999
- s. \$180,000 - \$189,999
- t. \$190,000 - \$199,999
- u. \$200,000 - \$209,999
- v. \$210,000 - \$219,999
- w. \$220,000 - \$229,999
- x. \$230,000 - \$239,999
- y. \$240,000 - \$249,999
- z. More than \$250,000

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